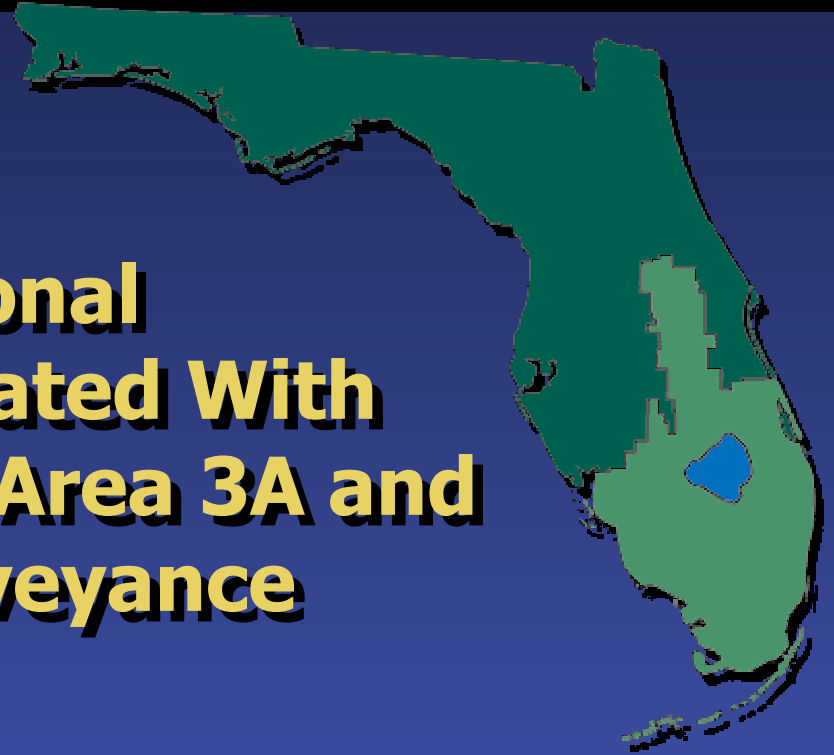


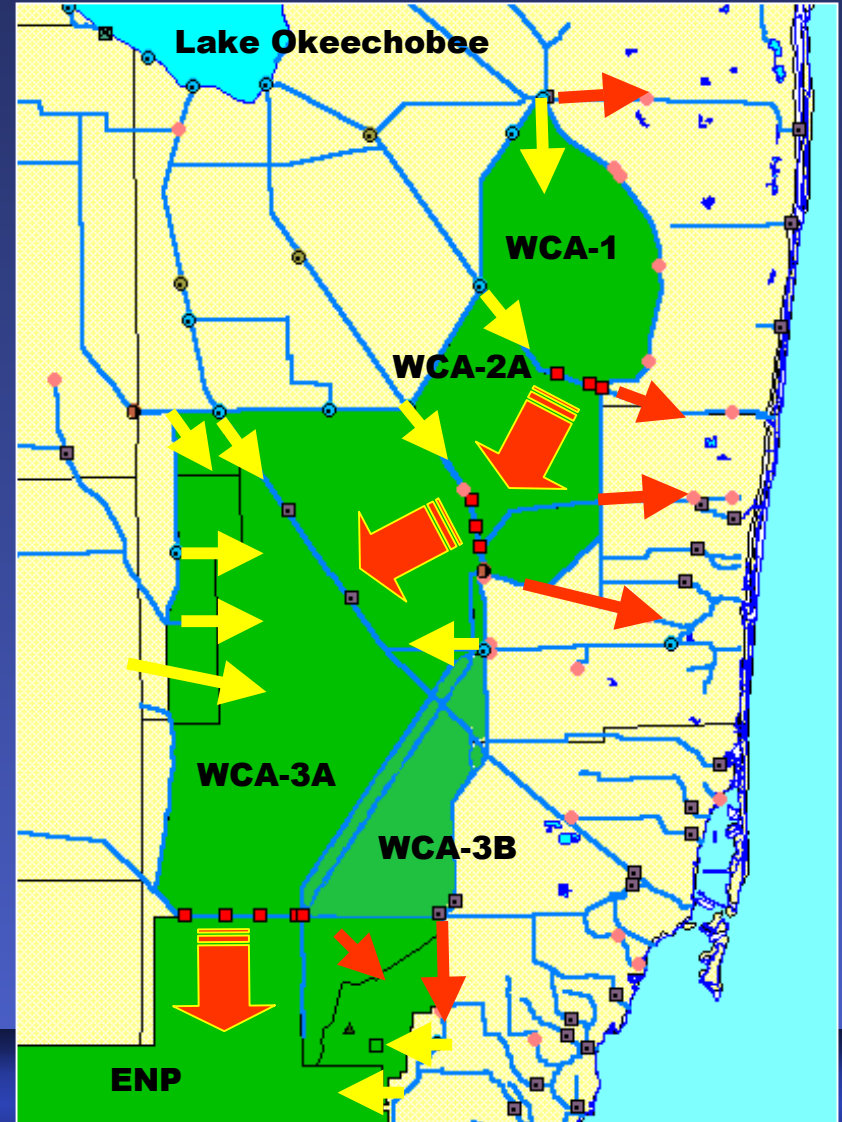
Generalized Operational Modifications Associated With Water Conservation Area 3A and the South Dade Conveyance System



***Tommy B. Strowd, P.E., Director
Operations Control, Engineering & Vegetation Management
Department***

Generalized WCA Operations

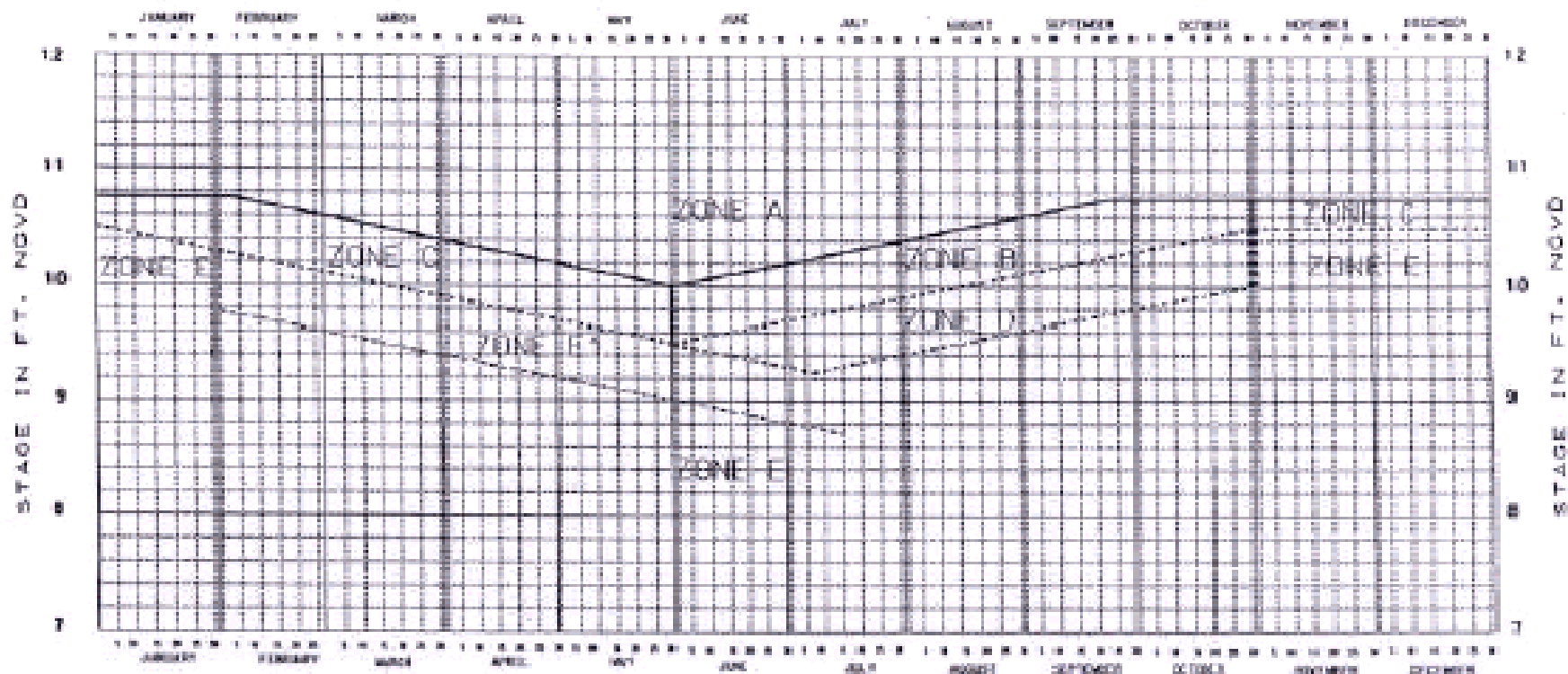
- Pumped inflows from urban & agricultural areas
- Regulatory Releases
 - WCAs & ENP
 - Tide via East Coast Canals



WCA Operations

- Water control facilities that make up Water Conservation Area 3A (WCA-3A) were constructed between 1960 and 1963
 - WCA Operations generally guided by their respective “Regulation Schedule”
 - Operations have been adjusted over time in response to changing objectives in and around Everglades National Park (ENP).





ZONE	DESCRIPTION
A	FLOOD RELEASES
B	UPPER TRANSITION, WET SEASON
C	UPPER TRANSITION, DRY SEASON
D	LOWER TRANSITION
E	RAINFALL FORMULA

ZONE	DESCRIPTION
E1	MAKE MAXIMUM PRACTICABLE RELEASES AT S-142, S-151, S-31, S-317, S-319, S-333, S-355 A & B, AND S-354 WHEN PERMITTED BY DOWNSTREAM CONDITIONS. IF THE HEADWATER AT S-333 FALLS BELOW 8.25 FT-NOVD, USE ZONE E RULES.

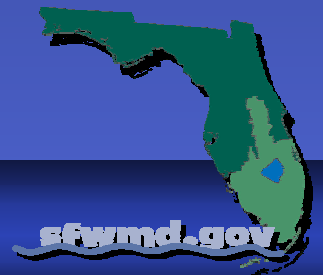
- NOTES: 1. ZONE INFORMATION IS DETAILED ON ATTACHED SHEET.
2. THE L-ETA BORROW CANAL SLUDGE SHOULD NOT BE DRAIN DOWN BELOW 7.5 FT-NOVD UNLESS WATER IS SUPPLIED FROM ANOTHER SOURCE.

CENTRAL AND SOUTHERN FLORIDA
INTERIM REGULATION SCHEDULE
INTERIM STRUCTURAL AND OPERATIONAL
PLAN 2001

WATER CONSERVATION AREA NO. 3A
DEPARTMENT OF THE ARMY, JACKSONVILLE DISTRICT
CORPS OF ENGINEERS, JACKSONVILLE, FLORIDA
Data revised: November 2000

The “Minimum Delivery Schedule”

- Developed for ENP in 1970
- This plan dedicated a minimum average annual flow to Shark River Slough and Taylor Slough



The South Dade Conveyance System

- Major structural elements of the South Dade Conveyance System were constructed in the period between 1974 and 1979
 - Focused to improve water supply capability to the southern portions of Dade County.



Historic WCA-3A Operations

- Primarily focused on flood control and water supply benefits
 - By 1980 it was recognized that optimum benefits (incl. environmental benefits) would be difficult to achieve through operation alone.
 - High water causes problems to tree island habitat and the area's deer population,
 - Low water causes a number of environmental and economic effects associated with water supply,
 - The timing and distribution of flood discharges created environmental problems in ENP
 - However no changes to the schedule were made at that time.



The Experimental Program

- In 1983, the South Florida Water Management District (District) developed, and was granted permission by the U.S. Army Corps of Engineers (Corps) to experiment with water releases based on rainfall and evaporation over the Everglades.
- Since that time, a near continuous series of modifications have been made to the operation of the C&SF Project to deal with the multiple, competing, water resource objectives in this region.



The Experimental Program Test Iterations

- Program Objectives (1983 authorization - PL 98-181)
 - Reduce excess water releases to Shark River Slough basin through the S-12 structures, especially during the normal dry season recession
 - Restore flow distribution across the entire width of Shark River Slough, the natural flowway into ENP including Northeast Shark River Slough.
 - Allow volume and timing of deliveries to fluctuate as they did historically in response to rainfall and antecedent water conditions in the southern Everglades
 - Maintain downstream Shark River Slough water levels at pre-project levels.
 - Maintain water quality so that resource degradation does not occur.



The Experimental Program Test Iterations

- Initial Tests

- Two short duration tests were conducted in the period between April 1984 and November 1984.

- The Rainfall Plan

- The “*Rainfall Plan*” of the Experimental Water Deliveries Program was initiated in 1985 and five experimental iterations with very similar operational components were conducted up to 1993.



The Experimental Program Test Iterations

- Test Iteration 6:

- In July 1993, the Corps, District and ENP began the 6th iteration, also know as the ***“Taylor Slough Demonstration Project”***.
 - This iteration included the elements contained in the pervious five test iterations
 - It included two new components, which
 - raised canal stages in the L-31N Borrow Canal during the wet season and
 - the addition of additional pumps at S-332 to increase flows into Taylor Slough.



The Experimental Program

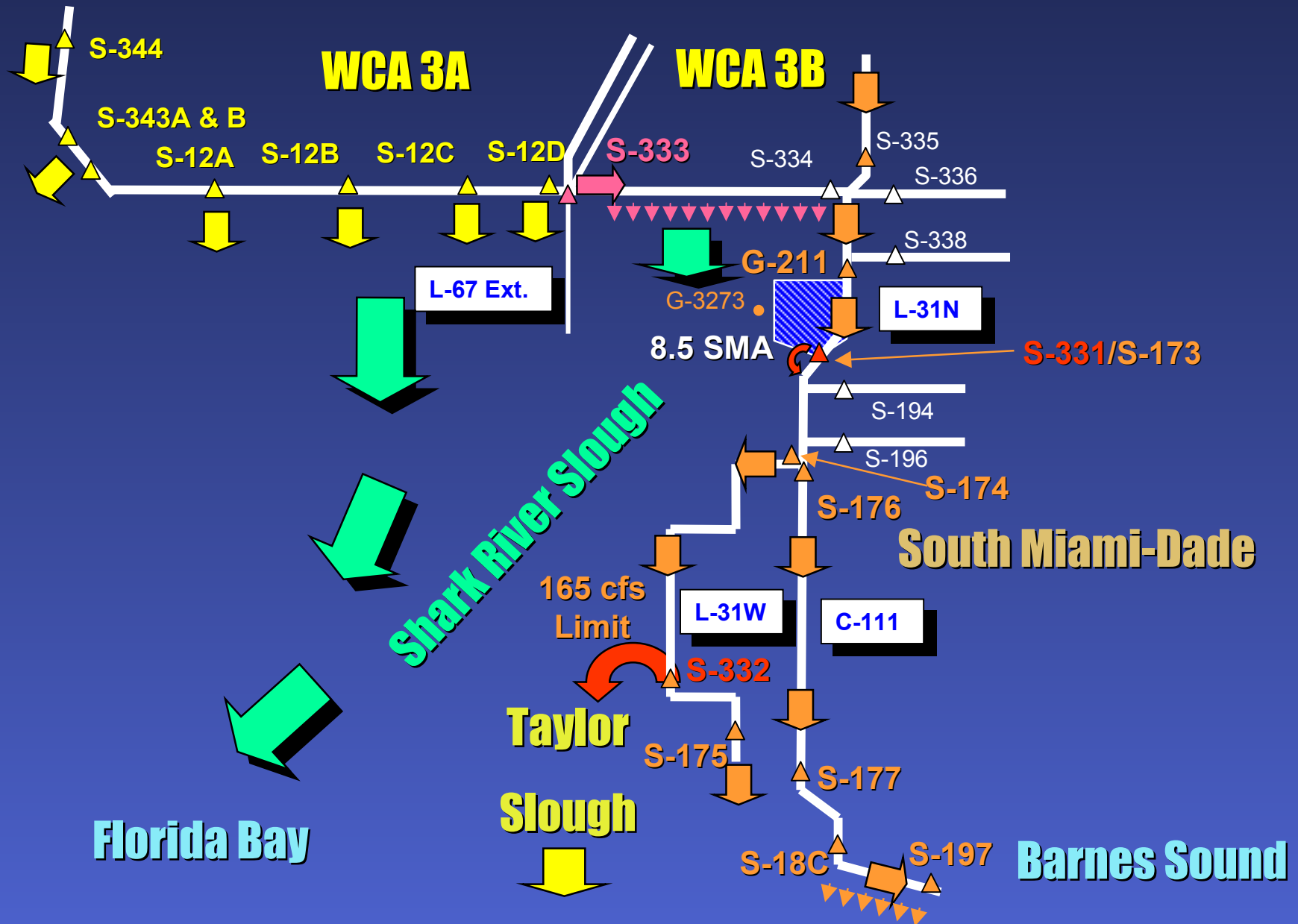
Test Iterations

- Test Iteration 7:

- In October 1995, the three cooperating agencies implemented the operating criteria for “Test Iteration 7” (Test 7). The goals of this test iteration were;
 - Deliver water to Northeast Shark River Slough and Taylor Slough in consonance with rainfall to the degree possible without compromising the flood control function of the C&SF Project.
 - Attempt to maintain desirable canal stages.
 - Pass as much excess water as possible westward into L-31 W Canal and Taylor Slough. Including the enhancement of flow to Florida Bay via Taylor Slough as well as reduce large discharges to Manatee Bay and Barnes Sound.



Experimental Program - Test 7 Phase I



The Experimental Program

Test Iterations

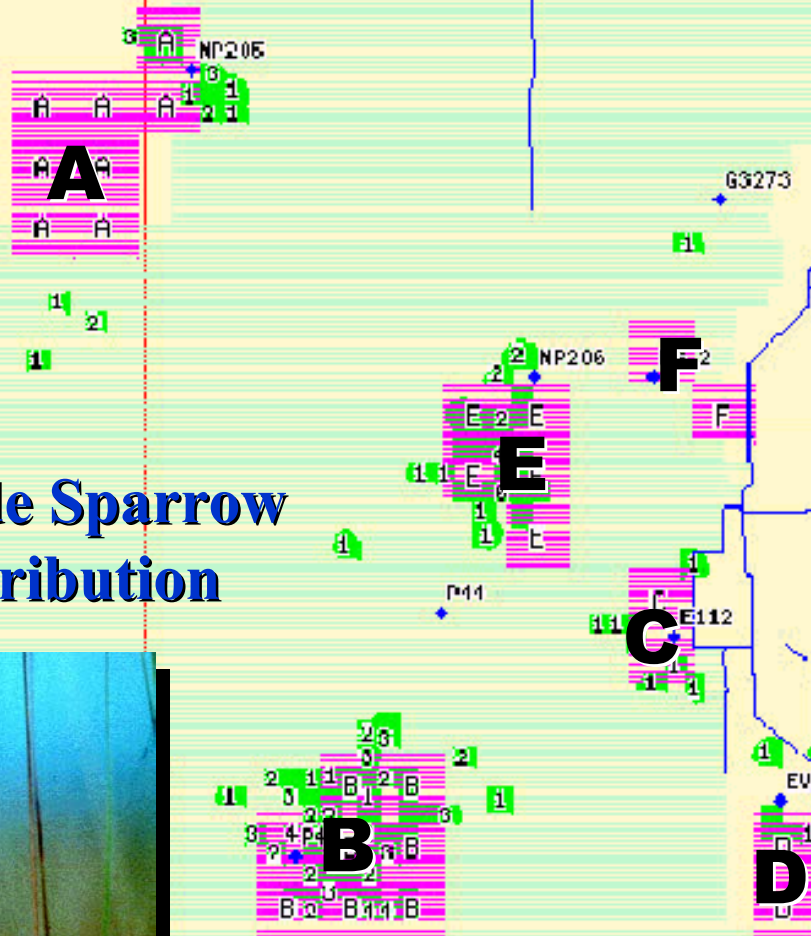
- Test 7 was to be implemented in two phases.
 - Phase II, which included construction of additional pumping capacity, was not implemented during the test.
 - Phase II operational criteria proposed generally higher operating levels for canals in the South Dade Conveyance system and
 - Utilized the S-332D pumping station concurrent with abandoning the use of S-175 on L-31W.



The Cape Sable Seaside Sparrow

- On February 19, 1999 the U.S. Fish and Wildlife Service issued a final Biological Opinion for the Modified Waters Delivery Program for Everglades National Park and the C-111 Project.
- The Biological Opinion concluded that continuation of Test 7 Phase I operations would cause adverse modifications to the Cape Sable Seaside Sparrow (CSSS) habitat and would jeopardize the continued existence of the CSSS.





The Cape Sable Seaside Sparrow

- The U.S. Fish & Wildlife Service also issued a Reasonable & Prudent Alternative (RPA) with the following requirements....
 - Produce a minimum of 60 consecutive days of water levels at or below 6.0 ft NGVD at the NP205 gage in western NESRS between March 1st & July 15th
 - Insure that 30%, 40% 60% of required regulatory releases crossing Tamiami Trail enter ENP east of the L-67 Extension in the years 2000, 2001 & 2002 respectively or...
 - Produce hydropatterns in the vicinity of sub-populations C, E & F that meet or exceed the targets
 - Produce hydropatterns that would be equivalent to those that would result from Test 7 Phase II operations

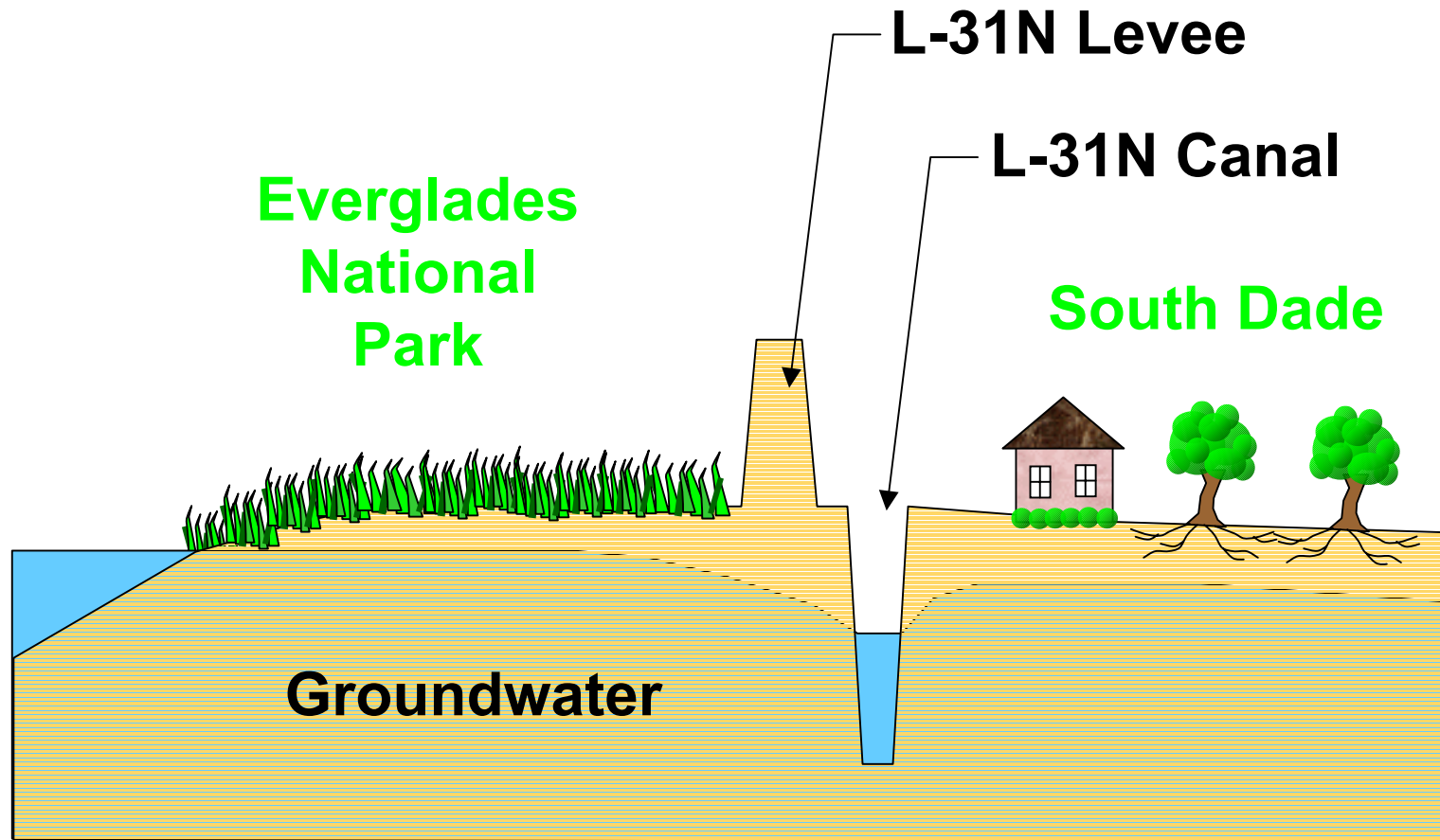


The Cape Sable Seaside Sparrow

- In December 1999, Test Iteration 7 of the Experimental Program was terminated and emergency operations were proposed under a series of temporary emergency deviations.
- The plan that defined these operations later became part of the Interim Structural and Operational Plan for the year 2000 (**ISOP 2000**).
- This was followed a year later by a similar plan known as **ISOP 2001**
- Each of these plans contained the construction of new temporary reservoir impoundments and associated conveyance facilities to facilitate meeting the plan objectives.
- ISOP 2001 has been recently superceded by a new structural and operational plan known as the Interim Operational Plan (**IOP**).



South Dade Conveyance System



South Dade Conveyance System

Flood Control Operations

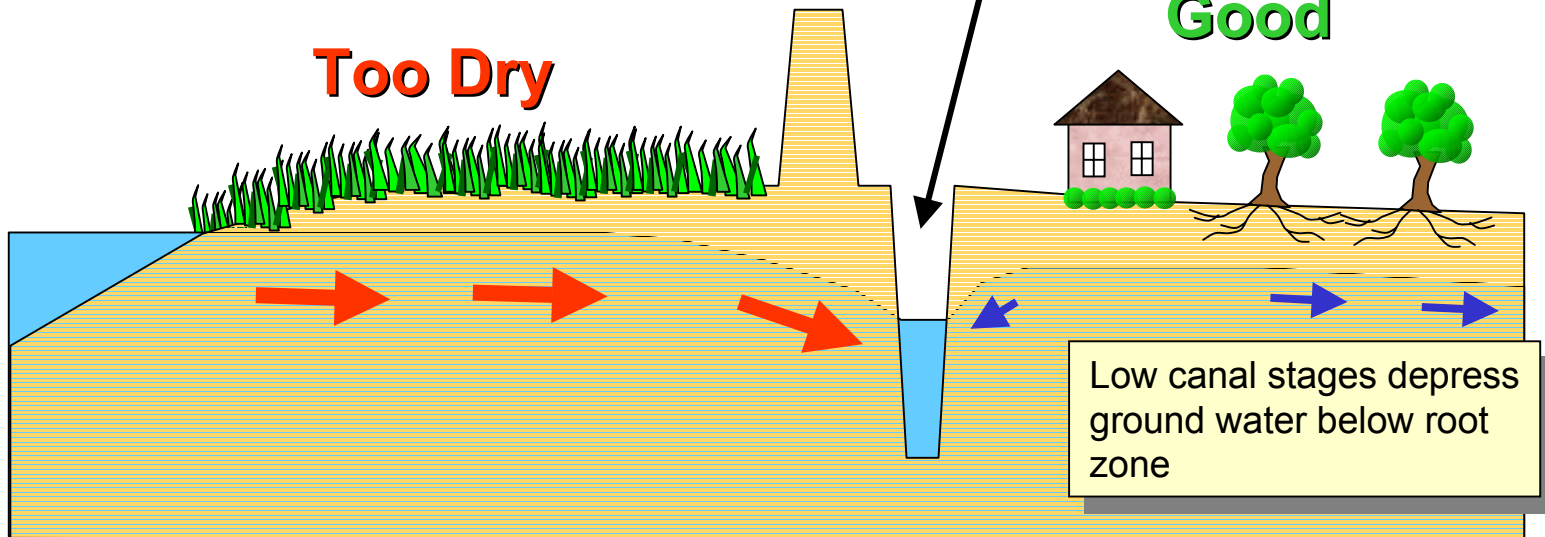
Low canal stages increase groundwater seepage from ENP, reducing surface water stages and shortens hydroperiods

Canal stages low to facilitate drainage of urban / ag lands to the east.

Good

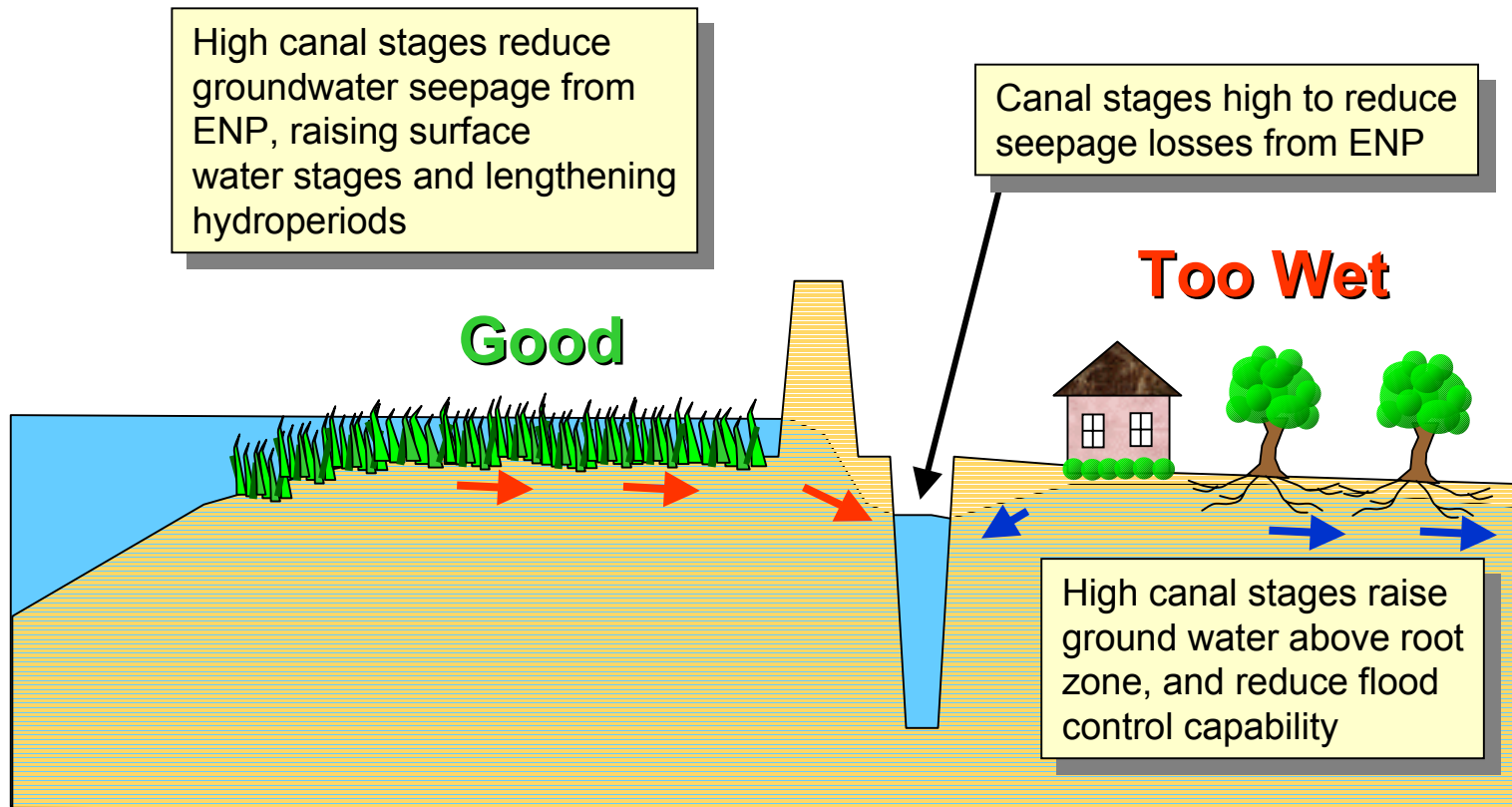
Too Dry

Low canal stages depress ground water below root zone



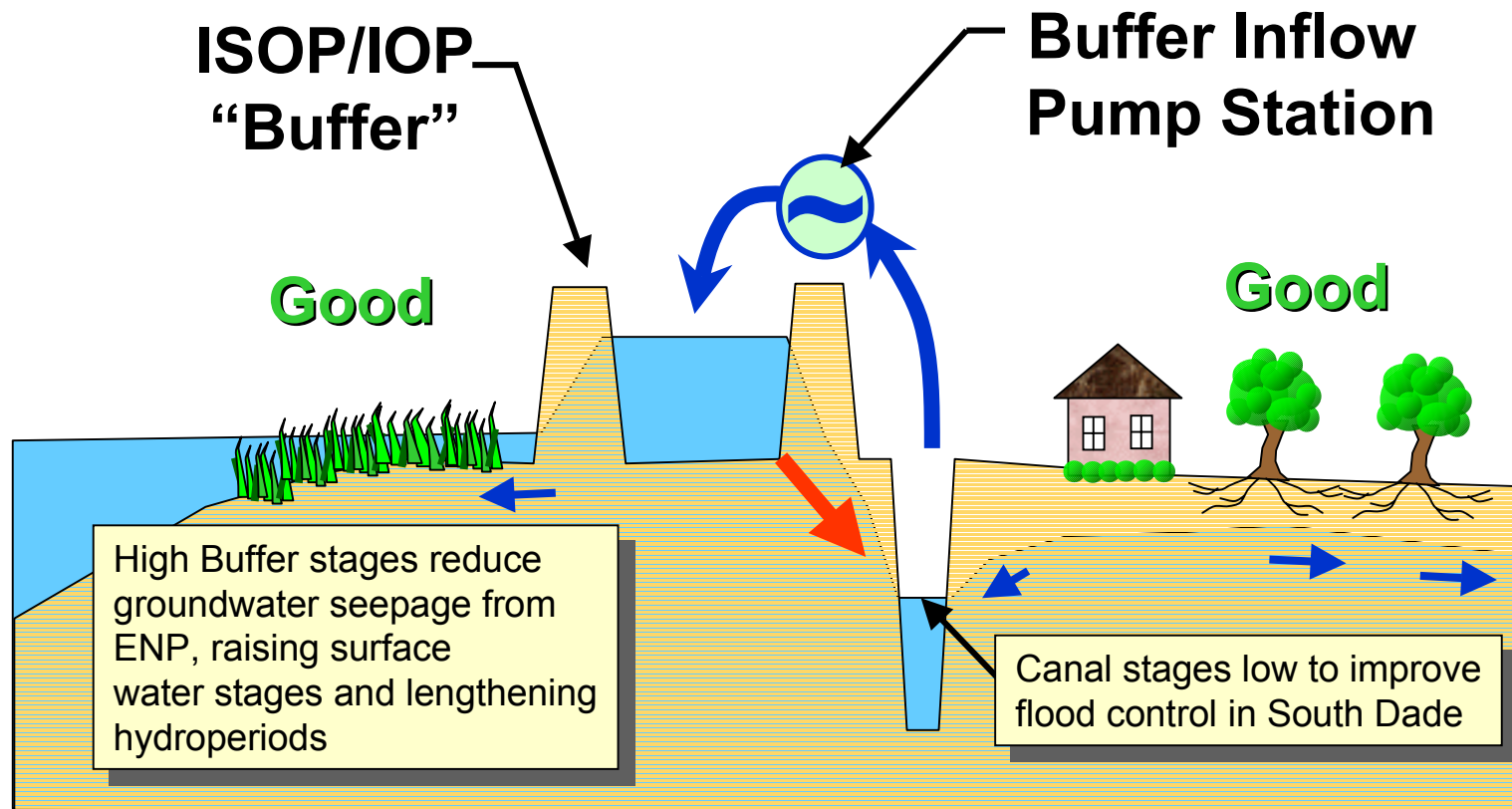
South Dade Conveyance System

Restoration Operations



South Dade Conveyance System

ISOP / IOP Operations



ISOP 2000

- ISOP 2000 was formulated and implemented in December 1999.
 - The plan provided water levels in the CSSS populations northwest of Shark River Slough slightly above or below ground level for a minimum of 60-consecutive days between March 1 and July 15.
 - New facilities under ISOP 2000 would be operated to provide flood protection and produce hydropatterns in ENP that would be the '*hydrologic equivalent*' to the hydropatterns that would be expected through the implementation Test 7, Phase II.



ISOP 2000

- To achieve the goal of maintaining optimum low water levels in the western population during the CSSS breeding season, ISOP 2000 implemented a staged closure of the S-343, S-344 & S-12 structures starting on November 1st.
- The closures continued with S-12B through D on a prescribed interval ending in January, with all structures remaining closed through the CSSS breeding season.
 - This was implemented through a modification to the regulation schedules for WCA-2A & WCA-3A.
 - Excess water from WCA-3A would be moved through S-333 into Northeast Shark River Slough and / or passed around the South Dade Conveyance System via S-334.
 - Pumped into impoundment at S-332B and into Taylor Slough at S-332D

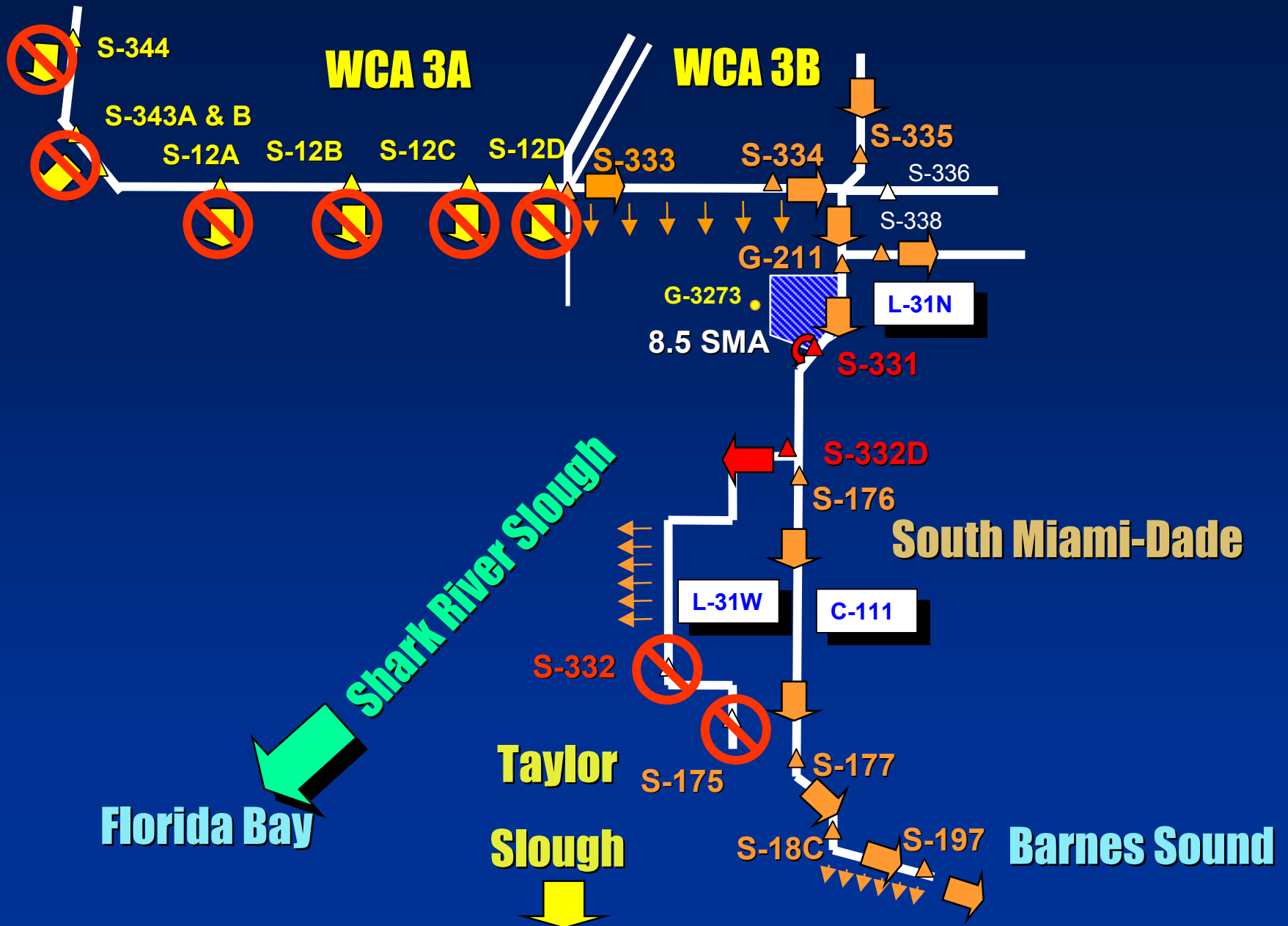


ISOP 2000

- Canal levels under ISOP 2000 would be managed lower than Test 7 Phase I to provide flood protection.
- To meet the equivalent hydrologic response in Taylor Slough and Northeast Shark River Slough required by the Biological Opinion, the Corps would
 - operate the S-332D pumping station and
 - construct and operate the S-332B temporary pumping station and detention basin.
 - However, S-332B construction was not completed in time to be used in ISOP 2000



ISOP 2000

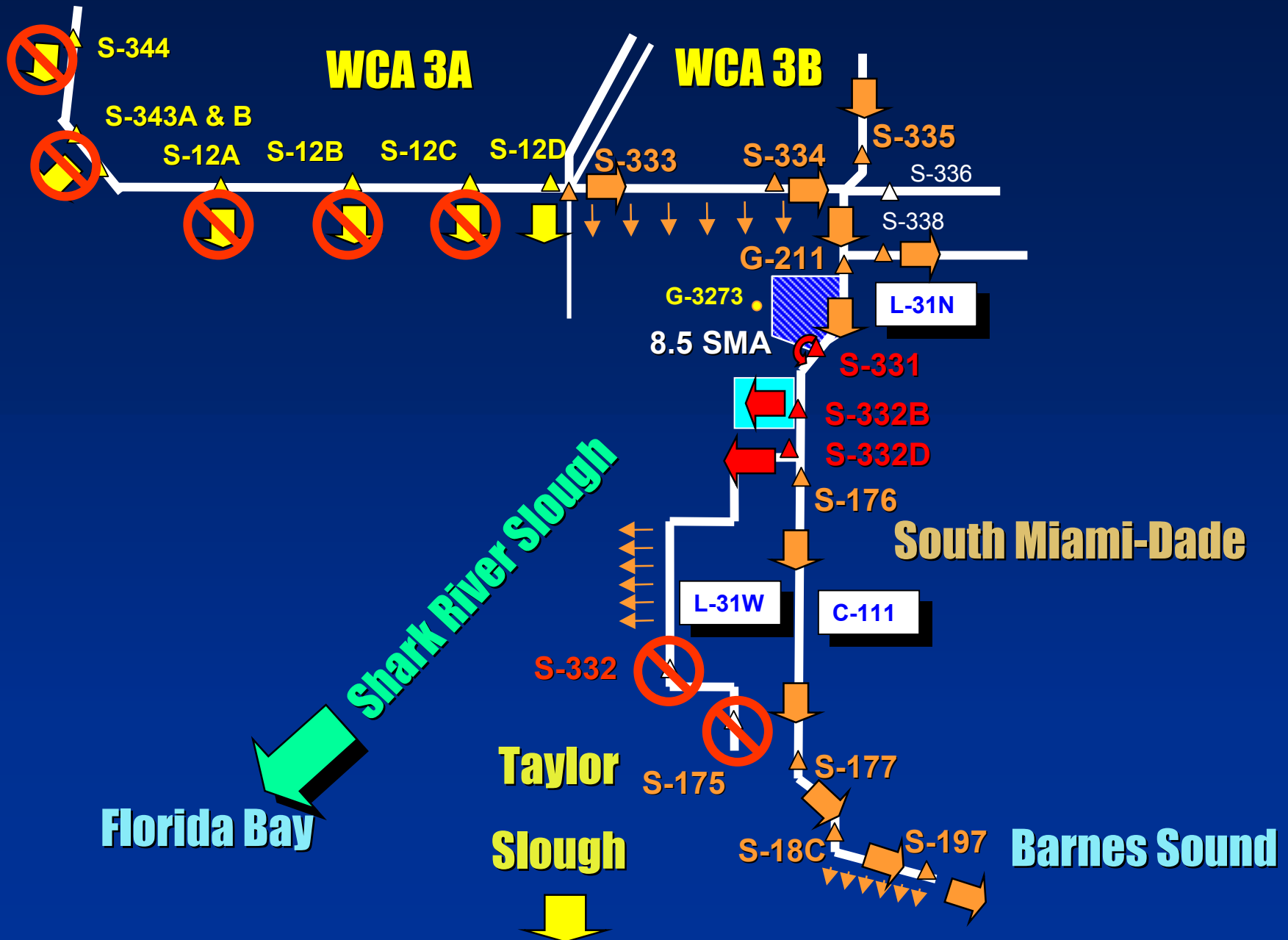


ISOP 2001

- ISOP 2001 was formulated and implemented in January 2001
 - The plan supported the same objectives as ISOP 2000
 - Plan components were similar except....
 - WCA-2A schedule modifications made in ISOP 2000 were removed
 - Minor WCA-3A schedule modifications
 - S-12D would remain open during breeding season
 - S-332B impoundment & pumps were in place



ISOP 2001



S-332B Looking West At Pumps



S-332B at L-31N



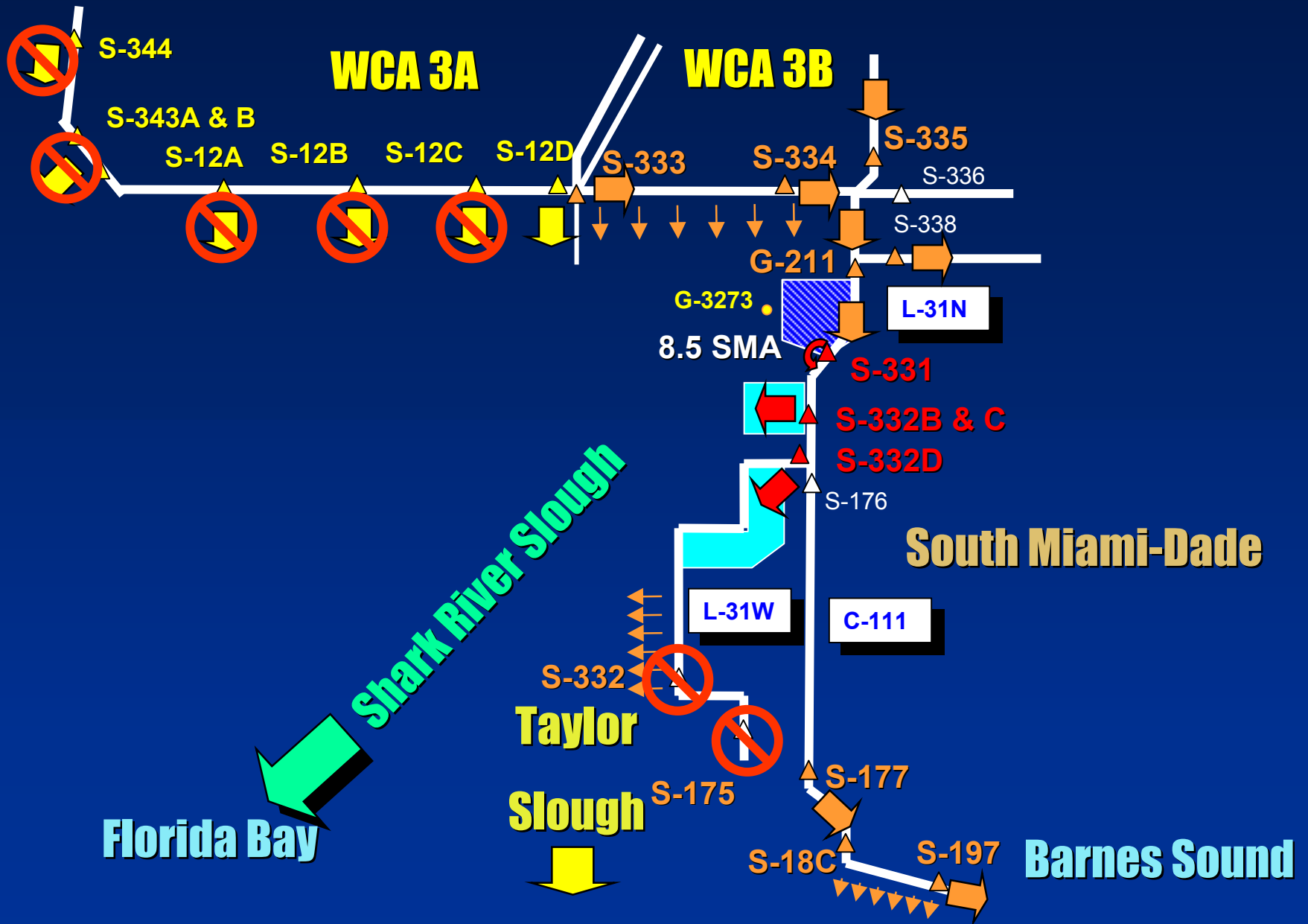
S-332B Looking North-East



Interim Operations Plan (IOP)

- IOP was implemented in June 2002
 - The plan supported the same objectives as ISOP 2000 & 2001
 - Plan components were similar to ISOP 2001 except....
 - New impoundments and pumping stations would be constructed
 - S-332B North Impoundment
 - S-332C Impoundment & Pumps
 - S-332C & D Connector
 - S-332D Impoundment
 - Remove southern 4 miles of the L-67 Extension
 - Higher canal stages through periods when excess water from WCA-3A is not being brought through the South Dade Conveyance System





S-332B North
Detention Area

S-332B West
Detention Area

S-332B to S-332C
Connector

S-332C
Detention Area

S-332D
Detention Area

S332B

C-103

S332C



Homestead Municipal

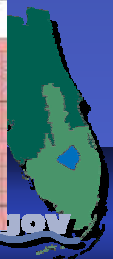
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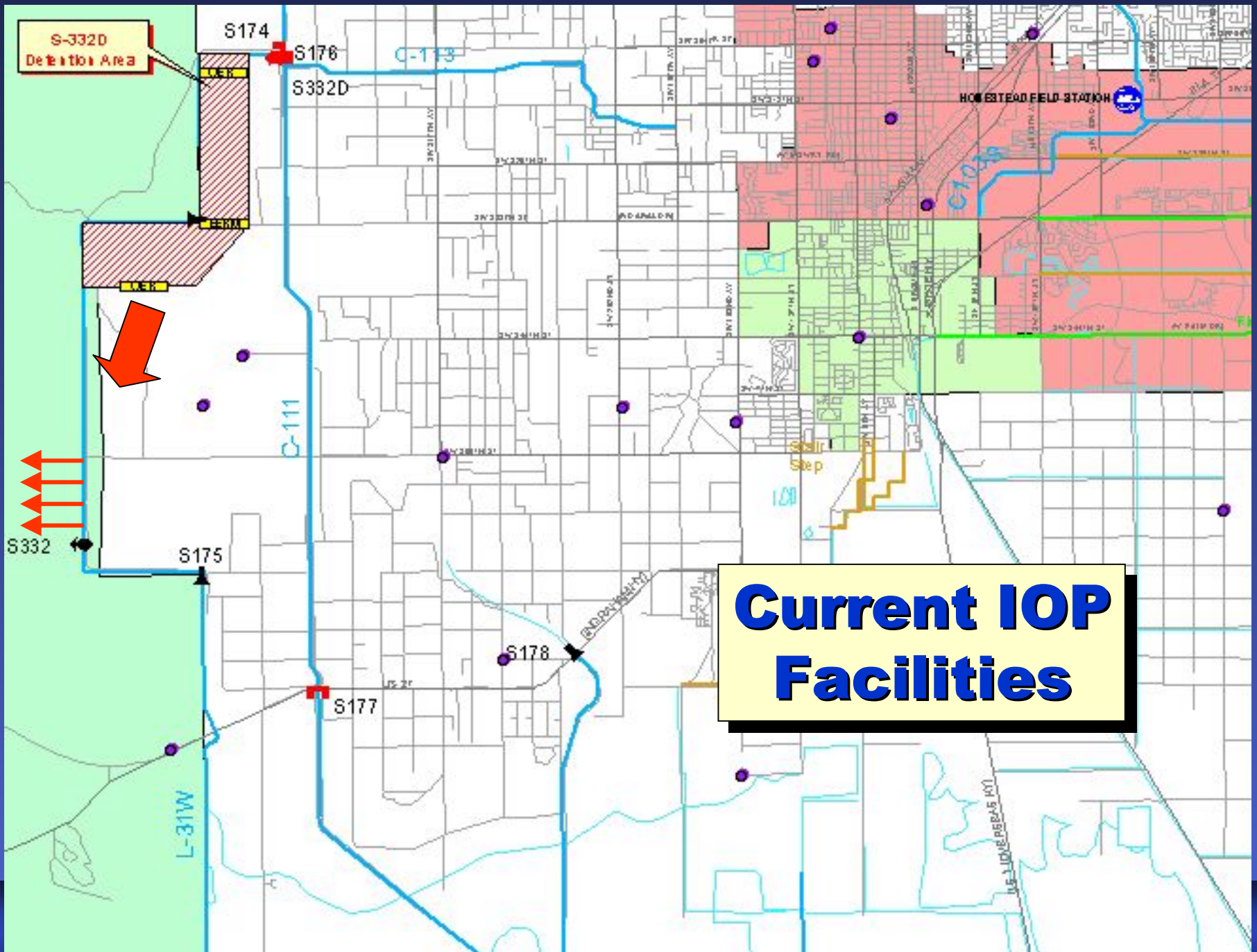
S176

C-113

S332D

Current IOP Facilities





**Current IOP
Facilities**

Interim Operations Plan (IOP)

- Other components....
 - Marsh Targets
 - Criteria to control high stages in impoundments
 - Focused to reduce water quality impacts to ENP by maintaining an east to west groundwater gradient
 - Pre-Storm Drawdown
 - Conditional criteria to allow reduction in canal / groundwater stages in advance of forecast heavy rain
 - Flood-Fighting Capability
 - Preserves ability to overflow impoundment weirs and other operational flexibility under flood conditions
 - Requires approval by USACE District Engineer



Interim Operations Plan (IOP)

- Additional modifications to operational criteria will be made as the Marsh Targets are refined in 2002 & 2003
- Land acquisition efforts are continuing
 - Operation of certain components can not be initiated until critical lands are purchased
 - S-332D North Impoundment
 - B&C Connector
 - Relocation of S-332B Overflow Weir



SUMMARY

- Modifications to the operations of WCA-3A and the South Dade Conveyance System have occurred over most of the past 20 years
- Responses of the system to various operational regimes are highly dependent upon meteorological conditions
 - Wet / Dry Seasons
 - Floods
 - Droughts



